HR
HURST-ROSCHE
ENGINEERS, INC

April 2, 2007
Revised April 17, 2007

SUBJECT: Volume Surveys & Density Evaluation
Chemetco, Inc. Facility
Hartford, Illinois

H-R 180-3696

Mr. Gary Davis, CHMM
EH&S Manager
Estate of Chemetco, Inc.
3754 Chemetco Lane
Hartford, Illinois 62048

Dear Mr. Davis:

We have completed topographic surveys of various locations throughout the Chemetco facility. Based on these surveys, we have estimated the volumes of scrubber sludge and slag stockpiled on site. Scrubber sludge has been identified as being located in five separate areas, including a concrete bunker located at the north end of the facility, the DIS building, the dome building, a polishing pit, and within the shipping and receiving building. Slag stockpiles are continuously located throughout the northeastern to southeastern areas of the facility, along with two smaller stockpiles south and southwest of the scrubber sludge bunker.

We have also completed an evaluation to identify density of the sludge and slag. One sludge sample was collected from the concrete bunker, and four separate slag samples were collected from various stockpile areas. The samples were compacted/placed into a container of known volume and resulting densities identified.

Based on the topographic surveys and density evaluation, we have calculated that 39,056 dry tons of usable scrubber sludge and 836,653 tons of slag are located on site. The weight presented for scrubber sludge is based on an in-place density of 1.24 ton/cy and varying moisture contents. The weight presented for slag is based on an in-place density of 1.85 ton/cy. These tonnages and associated volumes are based on the presumption that no materials have been placed below original ground surface (e.g., stockpiles originate at ground surface).

Enclosed are additional notes and documentation which identify data and presumptions utilized to complete the calculations.

If you have any questions or require additional information, please contact our office.

Sincerely,

HURST-ROSCHE ENGINEERS, INC.

David H. Kimmle, P.E.

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Summary of Scrubber Sludge Calculations
Chemetco Facility
Hartford, Illinois

Narrative Summary

Chemetco facility personnel have identified scrubber sludge as being located in five separate areas, including a concrete bunker located at the north end of the facility, the DIS building, the dome building, a polishing pit, and within the shipping and receiving building. These locations have been further described below. These areas were surveyed on March 6, 2007. Following are individual descriptions of these areas and associated calculations for each area. It is estimated that a total of 39,056 dry tons of usable scrubber sludge is present on site. This dry weight is based on density determinations and estimated moisture contents for the sludge (reference density evaluations).

Concrete Bunker

An approximate 2 5 acre concrete bunker is present along the north side of the facility. This bunker contains concrete retaining walls of varying heights, and is reported to contain a concrete floor. Apparent footers for the retaining walls are visible at various locations around the exterior base of the bunker. Where exposed, these footers were surveyed. The interior base of the bunker (e.g., finished floor elevation) is presumed to be at the same elevation as the elevation of the exposed footers. Accordingly, an elevation of 433 ft has been assigned as the base grade of the stockpiled sludge. Utilizing a three dimensional modeling program, a total volume of 62,204 cy has been calculated. Based on previous investigations and analyses completed by Chemetco personnel, the usable quantity of scrubber sludge in lower sections of the bunker is estimated to be 85%, while the usable quantity of scrubber sludge in upper sections of the bunker is estimated to be 40%. Considering these breakdowns, a supplemental calculation was completed to estimate the quantity of sludge present in the stockpile which extends above the height of the bunker walls. Of the 62,204 cy quantity, approximately 15,440 cy extends above the bunker walls (approximate elevation 445). Sludge in lower sections of the bunker is expected to be saturated, as evidenced by poncing water at the southeast corner of the bunker and the collection of a saturated sample for the density analysis. The moist unit weight of the sludge is estimated to be 1.24 ton/cy (reference density evaluation). The moisture content of saturated sludge in lower sections of the bunker is estimated to be 90%, while sludge in upper sections of the bunker is estimated to have a moisture content of 20%. Considering these moisture contents, the dry unit weights of sludge are estimated to be 0.65 ton/cy and 1.03 ton/cy for lower (saturated) and upper sections of the bunker, respectively. Accordingly, the following weight of usable dry scrubber sludge present within the bunker is calculated to be:

volume (cy) x dry density (tons/cy) x waste reduction (%)

46,764 cy in base of bunker x 0.65 tons/cy x 0.85 = 25,837 tons

15,440 cy stockpiled in top of bunker x 1.03 tons/cy x 0.40 = 6,361 tons

total = 32,198 tons

DIS Building

The DIS building is an enclosed structure located immediately south of the sludge bunker. This building encompasses approximately 10,000 sf. The dimensions of the stockpiled material within this building were measured, and a volume of 3,720 cy was calculated. Based on a previous investigation and analysis completed by Chemetco personnel, the usable quantity of scrubber sludge within this building is estimated to be 100%, and the sludge has a moisture content of 10%. Considering a moist unit weight of 1.24 ton/cy and a moisture content of 10%, the dry unit weight of this material is estimated to be 1.13 ton/cy. Accordingly, the following weight of usable dry scrubber sludge present within the DIS building is calculated to be:

volume (cy) x dry density (tons/cy) x waste reduction (%)

3,720 cy x 1.13 ton/cy x 1 = 4,204 tons

Dome Building

The dome building is a partially enclosed structure located immediately south of the sludge bunker and immediately west of the DIS building. The building encompasses approximately 10,000 sf, and a portion of the structure's roof has collapsed. The dimensions of the stockpiled material within this building were measured, and a volume of 2,030 cy was calculated. Based on a previous investigation and analysis completed by Chemetco personnel, the usable quantity of scrubber sludge within this building is estimated to be 90%, and the sludge has a moisture content of 20%. Considering a moist unit weight of 1.24 ton/cy and a moisture content of 20%, the dry unit weight of this material is estimated to be 1.03 ton/cy. Accordingly, the following weight of usable dry scrubber sludge present within the dome building is calculated to be:

volume (cy) x dry density (tons/cy) x waste reduction (%)

2,030 cy x 1.03 ton/cy x 0.9 = 1,882 tons

North Polishing Pit

An approximate 4,672 sf concrete pit is located in a central area of the site. This pit is reported to be 8 ft deep, and based on this depth contains 5 ft of sludge. Accordingly, the pit contains approximately 865 cy of material. The usable quantity of scrubber sludge within this pit is projected to be 100%. Considering a moist unit weight of 1.24 ton/cy and a presumed moisture content of 90%, the dry unit weight of this material is estimated to be 0.65 ton/cy. The following weight of usable dry scrubber sludge within the north polishing pit is calculated to be:

volume (cy) x dry density (tons/cy) x waste reduction (%)

865 cy x 0.65 tons/cy x 1 = 562 ton

Shipping and Receiving Building

The shipping and receiving building is an enclosed structure located north of the facility office. Scrubber sludge has been placed in large containers known as Supersacks within this building. At the time of the field investigation, 100 sacks were present in this building. Based on information provided by Chemetco personnel, each sack contains an average of 2.1 tons of sludge. The sludge is in a dry state. Accordingly, it is estimated 210 tons of usable dry sludge is present in the shipping and receiving building.

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Summary of Slag Calculations
Chemetco Facility
Hartford, Illinois

Narrative Summary

Chemetco facility personnel have identified slag as being located throughout the eastern portion of the site. A majority of this slag has been stockpiled in a large visible pile at the northeast corner of the site, with stockpiles of varying heights extending southward. Two smaller stockpiles are also present on site immediately south and southwest of the scrubber sludge bunker. The slag stockpile areas were surveyed on March 20, 2007. A three dimensional modeling program has been used to determine volumes of the stockpile areas. For the large stockpiles located along the eastern side of the site, an average base grade elevation of 433 ft has been considered. In general, this elevation represents an average of the existing grades around the perimeter of the large stockpile area. Similarly, base grades of 433 ft and 432 ft have been considered for the smaller stockpiles to the west.

A total slag volume of 452,245 cy has been calculated. Based on the independent density evaluation, the slag has a density of 1.85 tons/cy (137 pcf). It is presumed that the slag is relatively uniform throughout the site, the slag is in a dry state, and all slag is usable for recovery purposes. Considering this, 836,653 tons of slag are calculated to be present on site

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Summary of Density Evaluation
Chemetco Facility
Hartford, Illinois

Narrative Summary

An evaluation has been completed to estimate in-place density of sludge and slag. The evaluation has been completed by collecting representative samples of the sludge and slag, and then compacting/placing these samples into a container of known volume, and determining moist unit weights. Due to the nature of the sludge (e.g., compressible) various efforts were utilized when recompacting this product, however similar moist unit weights were determined. The composition of slag samples A, B, & C were visually similar and comparable unit weights were obtained for these samples. Slag sample D contained fewer fines, and correspondingly, a lighter unit weight was obtained for this sample.

Based on the evaluation, a moist unit weight of 1.24 ton/cy (92 pcf) has been utilized to determine the mass of sludge present on site, and a unit weight of 1.85 ton/cy (137 pcf) has been utilized to determine the mass of slag present on site.

Sample Collection

On March 29, 2007, a representative from Hurst-Rosche Engineers, Inc. visited the project site and collected one sample of scrubber sludge from the concrete bunker, and four samples of slag from various stockpile areas. Chemetco facility personnel assisted with sample collection. The sludge sample was collected from an approximate 4 ft depth from the southcentral area of the bunker. Approximately 5 gal of sludge was collected. The collected sludge was saturated. Four composite slag samples were collected from various locations. These samples have been labeled as Samples A through D. Each sample was developed by compositing material collected from three separate locations with n the sample area. Specifically, Sample A was developed from composite samples collected at the northern end of the slag stockpile area; Sample B was developed from composite samples collected just south of the Sample A locations; Sample C was developed from composite samples collected just south of the Sample B locations; and Sample D was developed from composite samples collected at the southern end of the slag stockpile area.

Scrubber Sludge Unit Weight

A representative portion of the collected sludge sample was placed in a 6 inch diameter Proctor mold of known volume. The material was placed in thin lifts (approximately 0.5 inches thick) to eliminate and/or reduce the development of voids. The resulting moist unit weight was determined to be 1.23 ton/cy (91 pcf). A second analysis was completed whereby the material was placed into the mold in approximate 2 inch lifts. Each lift was then compressed under a 2,400 psf load. This supplemental analysis was completed with the intent of assessing density change due to overburden pressure. The resulting moist unit weight from the supplemental analysis was determined to be 1.25 ton/cy (93 pcf). This supplemental analysis does not account for any increase in density that may occur due to consolidation settlement, however it is anticipated that the concrete bunker prevents and/or drastically reduces the potential for moisture dissipation

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within the sludge. Consequently, consolidation settlement of the sludge and resulting increase in density may be minimized due to the existing conditions.

The moisture content of the saturated sludge sample was determined to be 92%. Moisture content was determined in general accordance with ASTM D4959, whereby the mass of water in the sample is compared to the mass of the dry solid particles. Considering this moisture content, the corresponding dry unit weights of the samples would be 0.64 ton/cy and 0.65 ton/cy, respectively.

For determination of mass quantity of sludge present on site, an average moist unit weight of 1.24 ton/cy has been utilized.

Slag Unit Weight

A representative portion of each composite slag sample was placed in a container of known volume. The material was poured into the container, and then the container was tapped with a rubber mallet fifteen times. A straight edge was then used to level material flush with the top of the container. The resulting unit weights were determined.

Sample A	1.87 ton/cy (139 pcf)
Sample B	1.90 ton/cy (141 pcf)
Sample C	1.84 ton/cy (136 pcf)
Sample D	1.78 ton/cy (132 pcf)

Visual observation of the samples suggests that Samples A, B, & C contained more fines, thus resulting in higher unit weights. It is understood that Sample D was collected from an area where slag has been screened for processing purposes, thereby removing fines from the material.

For determination of mass quantity of slag present on site, an average unit weight of 1.85 ton/cy has been utilized.

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